

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A glycopeptide of the formula $A_1-A_2-A_3-A_4-A_5-A_6-A_7$, [SEQ ID NO:1] in which each dash represents a covalent bond; wherein the group A_1 comprises a ~~modified or unmodified~~ an α -amino acid residue, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic-carbonyl, heterocyclic-alkyl, heterocyclic-alkyl-carbonyl, alkylsulfonyl, arylsulfonyl, guanidinyl, carbamoyl, or xanthyl; where each of the groups A_2 to A_7 comprises a ~~modified or unmodified~~ an alpha α -amino acid residue, whereby (i) the group A_1 is linked to an amino group on the group A_2 , (ii) each of the groups A_2 , A_4 and A_6 bears an aromatic side chain, which aromatic side chains are cross-linked together by two or more covalent bonds, and (iii) the group A_7 bears a terminal carboxyl, ester, amide, or N-substituted amide group;

and wherein ~~one or more of the groups~~ A_1 to A_7 the group A_4 is linked via a glycosidic bond to

~~one or more glycosidic groups each having one or more sugar residues; wherein at least one of said sugar residues is a disaccharide modified to bear one or more substituents of the formula YXR , $N^+(R_1)=CR_2R_3$, $N=PR_1R_2R_3$, $N^+R_1R_2R_3$ or $P^+R_1R_2R_3$ in which the group Y is a single bond, O, NR₁ or S; the group X is O, NR₁, S, SO₂, C(O)O, C(O)S, C(S)O, C(S)S, C(NR₁)O, C(O)NR₁, or halo (in which case Y and R are absent); and R, R₁, R₂, and R₃ are independently hydrogen, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic carbonyl, heterocyclic alkyl, heterocyclic alkyl carbonyl, alkylsulfonyl or arylsulfonyl; and any pharmaceutically acceptable salts thereof; provided that at least one of the substituents of the formula YXR is not hydroxyl; X and Y are not both O; X and Y are not S and O, or O and S, respectively; and if two or more of said substituents are present, they can be the same or different; and~~

~~provided that when A_4 is linked to a disaccharide having a glucose residue directly attached to said A_4 residue, wherein said glucose residue that bears an N-substituted aminohexose residue, then said glucose residue is modified to bear and at least one of said substituents substituent of the formula YXR , $N^+(R_1)=CR_2R_3$, $N=PR_1R_2R_3$, $N^+R_1R_2R_3$ or $P^+R_1R_2R_3$, wherein the group Y is a single bond, O, NR₁ or S; the group X is O, NR₁, S, SO₂,~~

C(O)O, C(O)S, C(S)O, C(S)S, C(NR₁)O, C(O)NR₁, or halo (in which case Y and R are absent); and R, R₁, R₂, and R₃ are independently hydrogen, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic-carbonyl, heterocyclic-alkyl, heterocyclic-alkyl-carbonyl, alkylsulfonyl or arylsulfonyl; and any pharmaceutically acceptable salts thereof; provided that at least one of the substituents of the formula YXR is not hydroxyl; X and Y are not both O; X and Y are not S and O, or O and S, respectively; and if two or more of said substituents are present, they can be the same or different.

2. (Cancelled)
3. (Currently Amended) The glycopeptide of claim 2 1 in which wherein at least one of said substituents is attached to the C6 position of said hexose glucose residue linked directly to A₄.
4. (Cancelled)
5. (Currently Amended) The glycopeptide of claim 4 3 in which at least one of said substituents is YXR wherein Y is a single bond and X is O, NR₁, S or SO₂.
6. (Original) The glycopeptide of claim 5 wherein X is NR₁.
7. (Original) The glycopeptide of claim 5 wherein X is S.
8. (Original) The glycopeptide of claim 5 wherein X is SO₂.
9. (Original) The glycopeptide of claim 5 wherein X is O and R is not H.
10. (Currently Amended) The glycopeptide of claim 4 3 wherein at least one of said substituents YXR is halogen.
11. (Currently Amended) The glycopeptide of claim 2 1 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.
12. (Original) The glycopeptide of claim 3 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.
13. (Cancelled)
14. (Original) The glycopeptide of claim 5 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.
15. (Original) The glycopeptide of claim 6 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.
16. (Original) The glycopeptide of claim 7 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.

17. (Original) The glycopeptide of claim 8 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.

18. (Original) The glycopeptide of claim 9 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.

19. (Original) The glycopeptide of claim 10 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇, SEQ ID NO:1, form a dalbaheptide.

20. (Original) The glycopeptide of claim 11, wherein A₆ in said dalbaheptide is linked via a glycosidic bond to one or more sugar residues.

21. (Original) The glycopeptide of claim 11 wherein the amino acids in said dalbaheptide are those in vancomycin.

22. (Original) The glycopeptide of claim 20 wherein A₁, which is N-methyl leucine, has been selectively removed and replaced with another of said groups A₁.

23. (Currently Amended) The glycopeptide of claim 2 1 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

24. (Currently Amended) The glycopeptide of claim 3 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

25. (Cancelled)

26. (Currently Amended) The glycopeptide of claim 5 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

27. (Currently Amended) The glycopeptide of claim 6 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

28. (Currently Amended) The glycopeptide of claim 7 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

29. (Currently Amended) The glycopeptide of claim 8 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

30. (Currently Amended) The glycopeptide of claim 9 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

31. (Currently Amended) The glycopeptide of claim 10 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

32. (Currently Amended) The glycopeptide of claim 11 in which the ~~other hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

33. (Currently Amended) The glycopeptide of claim 12 in which the ~~ether hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

34. (Cancelled)

35. (Currently Amended) The glycopeptide of claims 14 in which the ~~ether hexose~~ N-substituted aminohexose residue bears at least one of said substituents.

36. (Original) The glycopeptide of claim 23 wherein at least one of said substituents is YXR wherein Y is a single bond and X is O, NR₁, S or SO₂.

37. (Original) The glycopeptide of claim 36 wherein X is NR₁.

38. (Currently Amended) The glycopeptide of claim 37 wherein said substituent is attached to C3 of said ~~ether hexose~~ N-substituted aminohexose residue.

39. (Withdrawn) A chemical library comprising a plurality of glycopeptides, each of said glycopeptides having the formula A₁-A₂-A₃-A₄-A₅-A₆-A₇, in which each dash represents a covalent bond; wherein the group A₁ comprises a modified or unmodified α-amino acid residue, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic-carbonyl, heterocyclic-alkyl, heterocyclic-alkyl-carbonyl, alkylsulfonyl, arylsulfonyl, guanidinyl, carbamoyl, or xanthyl; where each of the groups A₂ to A₇ comprises a modified or unmodified α-amino acid residue, whereby (i) the group A₁ is linked to an amino group on the group A₂, (ii) each of the groups A₂, A₄ and A₆ bears an aromatic side chain, which aromatic side chains are cross-linked together by two or more covalent bonds, and (iii) the group A₇ bears a terminal carboxyl, ester, amide, or N-substituted amide group;

and wherein one or more of the groups A₁ to A₇ is linked via a glycosidic bond to one or more glycosidic groups each having one or more sugar residues; wherein at least one of said sugar residues is a disaccharide modified to bear one or more substituents of the formula YXR, N⁺(R₁)=CR₂R₃, N=PR₁R₂R₃, N⁺R₁R₂R₃ or P⁺R₁R₂R₃ in which the group Y is a single bond, O, NR₁ or S; the group X is O, NR₁, S, SO₂, C(O)O, C(O)S, C(S)O, C(S)S, C(NR₁)O, C(O)NR₁, or halo (in which case Y and R are absent); and R, R₁, R₂, and R₃ are independently hydrogen, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic-carbonyl, heterocyclic-alkyl, heterocyclic-alkyl-carbonyl, alkylsulfonyl or arylsulfonyl; and any pharmaceutically acceptable salts thereof; provided that at least one of the substituents of the formula YXR is not hydroxyl; X and Y are not both O; X and Y are

not S and O, or O and S, respectively; and if two or more of said substituents are present, they can be the same or different; and

provided that when A₄ is linked to a disaccharide having a glucose residue that bears an N-substituted aminohexose residue, then said glucose residue is modified to bear at least one of said substituents YXR, N⁺(R₁)=CR₂R₃, N=PR₁R₂R₃, N⁺R₁R₂R₃ or P⁺R₁R₂R₃.

40. (Withdrawn) The chemical library of claim 39 wherein A₁ A₁-A₂-A₃-A₄-A₅-A₆-A₇ form a dalbaheptide and wherein said disaccharide comprises two hexose residues linked to A₄ and wherein at least the hexose residue linked directly to A₄ is modified to bear said substituent at the C6 position.

41. (Withdrawn) The chemical library of claim 40 wherein the other hexose residue bears a group YXR in which Y is a single bond and X is NR₁.

Claims 42-49 (Cancelled)

50 (Withdrawn) A method for producing the chemical library of claim 39, said method comprising at least two steps in each of which a substituent is introduced on a glycopeptide.

51. (Withdrawn) The method of claim 50 wherein at least one of said two steps comprises introducing a substituent on the 6-position of a hexose residue directly linked to A₄.

52. (Withdrawn) The method of claim 51 wherein the other of said at least two steps comprises introducing an N-substituent on an aminohexose residue bonded to said hexose residue directly linked to A₄.

53. (Withdrawn) The method of claim 52 wherein said hexose residue directly linked to A₄ is a glucose residue.

54. (Withdrawn) The method of claim 51 wherein A₁-A₂-A₃-A₄-A₅-A₆-A₇ form a dalbaheptide.

55. (Withdrawn) The method of claim 54 wherein the amino acids in said dalbaheptide are those in vancomycin.

56. (Withdrawn) The method of claim 55 wherein A₁ which is N-methyl leucine, has been selectively removed and replaced with another of said groups A₁.

57. (Withdrawn) A method of preparing a glycopeptide comprising:

- (a) selecting: (i) an aglycone that is soluble in one or more organic solvents, is derived from a glycopeptide antibiotic, and which aglycone has exactly one free phenolic hydroxyl group; and (ii) a protected first glycosyl donor;
- (b) allowing a first non-enzymatic glycosylation reaction to proceed in an organic solvent such that a first glycosidic bond is formed, which links said free phenolic hydroxyl group to the anomeric carbon of the first glycosyl donor to provide a pseudoaglycone having a protected first glycosyl residue;
- (c) selectively removing one protecting group from the first glycosyl residue to provide a pseudoaglycone bearing exactly one free hydroxyl group on the first glycosyl residue;
- (d) selecting a second protected glycosyl donor; and
- (e) allowing a second non-enzymatic glycosylation reaction to proceed in an organic solvent such that a second glycosidic bond is formed, which links said free hydroxyl group on the pseudoaglycone to the anomeric carbon of the second glycosyl donor.

Claims 58-73 (Cancelled)

74 (Withdrawn) A method for producing the chemical library of claim 39; said method comprising at least two steps, wherein at least one of said at least two steps comprises a glycosylation reaction which introduces a substituted sugar residue.

75. (Withdrawn) The method of claim 74 in which A₁ to A₇ are linked sequentially by peptide bonds and cross-linked as in a dalbaheptide.

76. (Withdrawn) The method of claim 75 in which said glycosylation reaction links said substituted sugar residue to an A₄ residue of an aglycone.

77. (Withdrawn) The method of claim 76 in which said glycosylation reaction links said substituted sugar residue to a sugar residue of a pseudoaglycone, wherein said sugar residue of a pseudoaglycone is linked to an A₄ residue of the pseudoaglycone.

78. (Withdrawn) The method of claim 76 in which a second glycosylation reaction links a second substituted sugar residue to said substituted sugar residue.

79. (Withdrawn) The method of claim 77 in which A1 is a modified or unmodified α -amino acid residue, and in which A₁ to A₇ are linked sequentially by peptide bonds and cross-linked so as to have the structure of a dalbaheptide.

80. (Withdrawn) The method of claim 78 in which A₁ is a modified or unmodified α -amino acid residue, and in which A₁ to A₇ are linked sequentially by peptide bonds and cross-linked so as to have the structure of a dalbaheptide.

81. (Withdrawn) The method of claim 77 in which the structures and interconnections of A₁ to A₇ are those found in vancomycin.

82. (Withdrawn) The method of claim 81 in which a glycosyl donor bearing an activated anomeric sulfoxide group is employed in each glycosylation reaction.

Claims 83-101 (Cancelled)

102. (Currently Amended) A glycopeptide antibiotic bearing at least one disaccharide group, said disaccharide group comprising two saccharide groups, a first of said saccharide groups bearing at least one amino or substituted amino group, and a second of said saccharide groups linked directly to said glycopeptide is modified to bear at least one substituent of the formula YXR, N⁺(R₁)=CR₂R₃, N=PR₁R₂R₃, N⁺R₁R₂R₃ or P⁺R₁R₂R₃, in which the group Y is a single bond, O, NR₁ or S; the group X is O, NR₁, S, SO₂, C(O)O, C(O)S, C(S)O, C(S)S, C(NR₁)O, C(O)NR₁, or halo (in which case Y and R are absent); and R, R₁, R₂, and R₃ are independently hydrogen, alkyl, aryl, aralkyl, alkanoyl, aroyl, aralkanoyl, heterocyclic, heterocyclic-carbonyl, heterocyclic-alkyl, heterocyclic-alkyl-carbonyl, alkylsulfonyl or arylsulfonyl, provided that the substituents of the formula YXR is not hydroxyl; X and Y are not both O; X and Y are not S and O, or O and S, respectively; and if two or more of said substituents are present, they can be the same or different which is not hydroxyl, or a pharmaceutically acceptable salt thereof.

103. (Original) The glycopeptide antibiotic of claim 102 wherein the second of said saccharide groups is glucose modified to bear at least one substituent which is not hydroxyl at the C6 position of said glucose.

104. (Original) The glycopeptide antibiotic of claim 103 which is vancomycin modified to bear at least one substituent which is not hydroxyl at the C6 position of said glucose.

105. (Original) The glycopeptide antibiotic of claim 104 wherein said at least one substituent which is not hydroxyl at the C6 position of said glucose is amino.

106. (Original) The glycopeptide antibiotic of claim 105 wherein the first of said saccharide groups bears at least one substituted amino group.

107. (Original) The glycopeptide antibiotic of claim 106 wherein said substituted amino group is NR₁H wherein R₁ bears one or more alkyl, substituted alkyl, aryl, substituted aryl, heterocyclic or substituted heterocyclic groups.

108. (Original) The glycopeptide antibiotic of claim 107 wherein at least one of said substituted alkyl groups is aralkyl.

109. (Original) The glycopeptide antibiotic of claim 107 wherein at least one of said substituted aryl groups is aralkyloxy substituted aryl.

110. (Original) The glycopeptide antibiotic of claim 107 wherein at least one of said substituted aryl groups is halo substituted aryl.

111. (Original) The glycopeptide antibiotic of claim 102 wherein the first of said saccharide groups bears at least one substituted amino group.

112. (Original) The glycopeptide antibiotic of claim 111 wherein said substituted amino group is NR₁H wherein R₁ bears one or more alkyl, substituted alkyl, aryl, substituted aryl, heterocyclic or substituted heterocyclic groups.

113. (Original) The glycopeptide antibiotic of claim 112 wherein at least one of said substituted alkyl groups is aralkyl.

114. (Original) The glycopeptide antibiotic of claim 112 wherein at least one of said substituted aryl groups is aralkyloxy substituted aryl.

115. (Original) The glycopeptide antibiotic of claim 112 wherein at least one of said substituted aryl groups is halo substituted aryl.

116. (Original) The glycopeptide antibiotic of claim 112 wherein said at least one substituent which is not hydroxyl is amino.